



# THE UNIVERSITY OF CHICAGO

## COMPUTATIONAL AND APPLIED MATHEMATICS STUDENT SEMINAR

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### Multi-Model Communication and Data Assimilation

THURSDAY, December 6, 2018, at 1:00 PM  
Jones 226, 5747 South Ellis Avenue

#### ABSTRACT

Models for weather and climate prediction are complex, and each model typically has at least a small number of phenomena that are poorly represented. On the other hand, it is sometimes possible to design a low-dimensional model for a phenomenon, such as the MJO, with significant skill, although the model may not represent the dynamics of the full weather-climate system. Here a strategy is proposed to mitigate these model errors by taking advantage of each model's strengths. The strategy involves inter-model data assimilation, during a forecast simulation, whereby models can exchange information in order to obtain more faithful representations of the full weather-climate system. As an initial investigation, the method is examined here using a simplified scenario of linear models, involving a system of stochastic partial differential equations (SPDEs) as an imperfect tropical climate model and stochastic differential equations (SDEs) as a low-dimensional model for the MJO. It is shown that the MJO prediction skill of the imperfect climate model can be greatly enhanced. Such an approach could provide a route to improving global model forecasts in a minimally invasive way, with modifications to the prediction system but without modifying the complex global physical model itself.